Changing Income Inequality in Nonmetropolitan Counties, 1980 to 1990*

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ABSTRACT   Income inequality has been increasing across the United States, but little is known about changing income inequality in nonmetropolitan counties. Data from the 1980 and 1990 Summary Tape Files of the U.S. Census of Population and Housing are used to estimate ordinary least squares models of change in income inequality. Household income inequality increased in a smaller share of nonmetro than metro counties from 1980 to 1990, and increases in income inequality were influenced more strongly by economic restructuring in nonmetro than in metro counties. Other factors, such as change in household structure, demographic composition, and labor supply and job quality, were generally similar in affecting income inequality in nonmetro and metro counties. The greater importance of economic restructuring in nonmetro counties indicates the lesser diversity and smaller size of local economies, and their greater vulnerability to forces of economic restructuring.

Increasing income inequality has generated a great deal of interest and many explanations for why it has occurred (Chevan and Stokes 2000; Danziger and Gottschalk 1994; Jones and Weinberg 2000; Lobao, Rulli, and Brown 1999). Yet few researchers have examined how extensively the increase in income inequality has been felt across nonmetropolitan (nonmetro) America and whether the factors associated with this increase vary across metropolitan (metro) and nonmetro areas (for an exception see Tolbert and Lyson 1992). I address this question.

First, I examine patterns of increasing household income inequality across nonmetro and metro counties from 1980 to 1990. Second, I assess the extent to which economic restructuring, changing demographic and household composition, and changes in labor supply differentially influence change in income inequality in nonmetro and metro counties. Third, I examine whether the forces associated with households' shifts toward the top or the bottom of the income distribution differ for metro and nonmetro counties.

Explanations for Increasing Income Inequality

Although income inequality certainly has been increasing in the United States overall, the explanations are still being debated (Glickman 2000). It is generally agreed that economic restructuring, changing household structure and demographic change, and variations in different groups' labor supply have contributed to this increase. The disagreement centers on which explanations contribute the most. The findings of prior studies may vary because some studies focus on earnings inequality (Bernard and Jensen 1998; Borjas and Ramey 1994; Bound and Johnson 1992; for reviews, see Levy and Murnane 1992; Morris and Western 1999), while others examine family or household income inequality (Bishop, Formby, and Smith 1997; Chevan and Stokes 2000; Levernier, Partridge, and Rickman 1998; Nielsen and Alderson 1997). Some use individual-level national data and examine inequality within race and gender (Bernhardt, Morris, and Handcock 1995; McCall 2000, 2001); others use states (Bernard and Jensen 1998; Levernier, Rickman, and Partridge 1995), metropolitan areas, or counties (Chevan and Stokes 2000; Lobao et al. 1999; Nielsen and Alderson 1997) as the units of analysis. Most recently, change in income inequality over time has become the topic of investigation (Chevan and Stokes 2000; Jones and Weinberg 2000).

These studies assume that there is a single set of relationships between the factors mentioned above and income inequality. They fail to consider that the relationship between changes in income inequality and (for example) economic restructuring or changing household structure may vary across more and less rural settings, or across areas with different dominant industries (for exceptions see Horan and Tolbert 1984; Lobao 1990).

Why would this be the case? Below I briefly describe a theoretical rationale for why factors associated with changes in income inequality would vary across different types of local economies, with a focus on rural or nonmetro settings. The issue is not whether rural economies and industrial structures are different from those in urban areas; this point is well documented, as are the substantial variations across rural economies (Brown and Lee 1999). Rather the question is "What is it about rural places that would cause a different relationship between a change in industry structure, for example, and a change in income inequality?"

I suggest that two attributes of rural economies distinguish rural from urban places in understanding change in income inequality. First, rural labor markets or economies tend to be less diverse than urban economies. Rural labor markets often are dominated by one or two industrial sectors; thus any shifts to capital-intensive technology, new production processes, or changes in markets in those dominant

sectors will exert strong effects on local jobs, earnings, and household incomes. If these less diverse labor markets also contain a few large, dominant employers, then any force that changes the conditions faced by those large employers will have substantial implications for the local economy. Closure or reduced employment on the part of a major employer in a smaller local economy will create ripple effects throughout the rest of that economy. Alternatively, when a large plant moves into a less diverse economy, the move will exert a major influence on job opportunities. Depending on the wage structure, it may offer higher-quality employment, but its introduction to the local economy also may spur employment growth in other sectors such as retail trade and services. These changes are likely to influence the income distribution more strongly in smaller, less diverse economies, such as are found in nonmetropolitan or rural areas.

Second, there is clear evidence that recent economic restructuring has differed in metro and nonmetro areas (Barkley 1993; Galston and Baehler 1995; Lyson 1989; Lyson and Falk 1993). Insofar as the nature of employment change related to restructuring also differs, a given increase (or decrease) in employment in a particular industrial sector may have very different implications. For example, the decline in manufacturing employment has been well documented. The difference in manufacturing employment in rural and urban areas also is well known: rural plants are more likely to be mass-production installations that located in the country in search of low wages, low land prices, and low production costs (Galston 2000). This fact, combined with nonmetro areas' lesser ability to attract or keep industries that need better-educated or more highly skilled workers to operate computer-driven production facilities, places nonmetro areas and workers at a disadvantage (Glasmeier 1993). Growth in the service sector in rural areas also has tended to be in personal services and retail trade, which often create lower-paying jobs. High-end service-sector jobs in health and business services locate in urban or metro areas. This urban agglomeration of high-end business services and telecommunications facilities (among others) suggests that sector growth or decline has very different implications for income levels and income inequality in metro and nonmetro areas (Galston 2000; Galston and Baehler 1995; Smith 1993).

It is more difficult to make an argument that changes in household composition, demographic change, and labor supply and demand will exert different effects on changes in income inequality across different types of labor markets. Increases in female-headed or single-person households are associated with increases in income inequality (Chevan and Stokes 2000), but there is little reason to expect any difference in

their effects on income inequality in metro and nonmetro areas. An increase in households headed by older persons may have differential effects insofar as elder households tend to locate or stay in particular places. In this case, retirement destinations may attract better-off elders, while poorer areas may retain their poor elderly individuals (Longino 1995; Longino and Smith 1998; McLaughlin and Jensen 1993; Reeder, Schneider, and Green 1993).

In addition to changes in household structure, other demographic factors are expected to influence income inequality similarly in metro and nonmetro areas. These include racial composition (Cohen 1998; Colclough 1990; McCall 2001) and the effects of a large birth cohort (the baby boomers) on the labor market (Bloom, Freeman, and Korenman 1987; Browne 1995; Easterlin 1987; Macunovich 2000). Given the lower returns to college education in nonmetro areas (Galston 2000; McLaughlin and Perman 1991; Jensen and McLaughlin 1995), I expect that an increase in educational attainment will exert a smaller effect on increasing income inequality in nonmetro areas than in metro areas (Bluestone 1990; McCall 2000; Murphy and Welch 1993). Migration is another aspect of demographic change that could affect changes in income inequality (Nicolaeva and McLaughlin 2001). Nonmetro areas that attract in-migrants may differ significantly from those which do not (Brown et al. 1997; Fulton, Fuguitt, and Gibson 1997), while most metro areas attract in-migrants; thus I expect differential effects of in-migration on changes in income inequality, although the direction of effects is difficult to predict.

The labor supply of women and changes in part-time jobs influence income inequality, but again there is little reason to expect differences in these forces across metro and nonmetro areas. Current increases in women's labor force participation have been linked to increases in family income inequality because married women in particular have increased their participation in the labor force, often to offset lost spousal earnings or as part of a dual-career couple (Cancian, Danziger, and Gottschalk 1993; Cancian and Reed 1998, 1999; Treas 1987). Much economic restructuring has been associated with increases in part-time and contingent employment (Belous 1989). Because part-time jobs often are filled by less highly educated or skilled workers and because such jobs are less well-paid, an increase in the share of employment that is part-time increases inequality in earnings and household income.

Overall I expect the effects of economic restructuring on household income inequality to be stronger in nonmetro than in metro areas because local economies tend to be less diverse in nonmetro areas; thus the consequences of economic change are more dramatic. Other fac-

tors, such as changes in household structure and demographics and in labor supply and part-time work, are generally expected to bear similar relationships to changes in household income inequality in metro and nonmetro areas.

Data and Methods

Household income inequality is an aggregate measure of the distribution of incomes across households. I use data from the Summary Tape Files (STF3C) of the U.S. Census of Population and Housing for 1980 and 1990 (U.S. Bureau of the Census 1983, 1993) as the basis for the measures of change in county-level household income inequality and for most of the measures of independent variables. (Data for 2000 are not yet available.) Exceptions include the indicators of industrial dominance, which are taken from the ERS typology of counties (USDA 1995). Variables are defined in Table 1; only the measures of income inequality are discussed further here.

The dependent variables—the median, upper, and lower polarization measures—are based on relative distribution methods (Handcock and Morris 1998, 1999). These measures, as used here, indicate the extent to which households have shifted in the income distribution over time. I ranked households in each county in 1980 from lowest to highest income (on the basis of household income reported for 1979) and then determined the income of the household at the tenth, twentieth, thirtieth, . . . , ninetieth percentile. Using inflation-adjusted and median-matched household income (to ensure that any shifts of households are due entirely to changes in the shape of the household income distribution), I calculated the share of 1990 households (reporting 1989 household income) that fell into each of the 1980 deciles. I smoothed categorical income in the STF files and applied a Pareto distribution to the top category.

By definition, for example, each decile in 1980 contained 10 percent of the 1980 households. In 1990, however, the households could be distributed differently. If the 1980 cut-point for the first decile was $10,000, then all households in 1990 with inflation-adjusted household incomes of $10,000 or below would fall into that decile. If this share was 15 percent in 1990, that would contribute to an increase in overall inequality (the median polarization index) and to an increase in inequality among households below the median household income (the lower polarization index). I use this information to calculate measures of change in the income distribution—polarization indices (see Handcock and Morris 1999) that capture the reallocation of households across income deciles.

The polarization indices are scaled from –1 to 1, which I multiply by 100 to eliminate leading decimals from the estimated coefficients. A

positive value for the median polarization index reflects a shifting of households away from the middle of the income distribution (the middle deciles) and toward either end, representing an increase in inequality. A positive value for the upper polarization index indicates a shift away from the median and toward the top deciles of income; a positive value for lower polarization suggests a shift away from the median and toward the bottom of the income distribution. Used alone, the upper and lower polarization measures do not reflect an overall change in income inequality; rather, they indicate where in the income distribution the shifts are occurring.

Polarization indices differ from other measures of income inequality (e.g., Gini coefficient, income share ratios) in that other measures assess inequality at only one time point. For example, a Gini coefficient indicates the extent to which the distribution of income among households differs from an ideal (equal) distribution (Allison 1978). To assess change in the distribution of incomes, one must compare values from two time points. The dependent variable would be the difference (for example) between the 1990 and the 1980 Gini coefficient. Calculation of a difference measure will indicate that an increase (or decrease) in inequality may have taken place, but it is unclear where in the distribution the shift occurred. The advantages of the polarization indices are that they are designed to be measures of change in the shape of the income distribution and that they indicate clearly the shifting of households toward or away from the tails of the income distribution.

Descriptive analysis of change in income inequality across counties shows that both metro and nonmetro counties have experienced increases and decreases in income inequality. For each set of models used to meet the second and third objectives, I estimate ordinary least squares regression models separately for metro and nonmetro counties in the contiguous counties of the United States. The explanatory variables are measures of economic restructuring as well as of changes in household structure, demographics, labor supply, and job quality, along with some controls for population size and change in population size. I examined diagnostics for multicollinearity in the models (Belsley, Kuh, and Welch 1980), but found no evidence of degrading multicollinearity.[1]

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[1] Multicollinearity is a concern in ecological models. Because the variables in these models are predominantly change measures, the linear relationships common in using industry structure measures are not so problematic. The average variance inflation factors in the models ranged from 1.57 to 3.55. A variance inflation factor of 1 indicates that a particular *X* is not related linearly to the other independent variables. A mean variance inflation factor that is considerably larger than 1 indicates serious multicollinearity (Neter, Wasserman, and Kutner 1985:391–92).

Table 1. Variable Definitions and Descriptive Statistics

Variable Name and Description	Descriptive Statistics: Mean (Standard Deviation) Minimum and Maximum Values		
	Total	Nonmetro	Metro
Dependent variables			
Median polarization index	1.289 (4.47)	1.004 (4.71)	2.082 (3.60)
	−22.42 to 20.28	−22.42 to 20.28	−13.83 to 15.71
Upper polarization index	2.706 (7.40)	2.117 (7.71)	4.348 (6.18)
	−33.93 to 38.93	−33.93 to 38.54	−15.05 to 32.33
Lower polarization index	−.129 (5.62)	−.110 (6.04)	−.183 (4.25)
	−63.84 to 25.33	−63.84 to 25.33	−15.11 to 12.00
Economic restructuring [a]			
% employed in agriculture	−1.424 (2.72)	−1.773 (3.021)	−.452 (1.15)
	−31.63 to 10.91	−31.63 to 10.91	−7.21 to 7.69
% employed in mining	−.892 (2.69)	−1.059 (3.02)	−.424 (1.34)
	−36.11 to 18.14	−36.11 to 18.14	−20.90 to 2.00
% employed in construction	−.281 (2.12)	−.413 (2.24)	0.087 (1.67)
	−20.15 to 10.19	−20.15 to 10.19	−11.83 to 5.52
% in nondurable manufacturing	−1.224 (2.90)	−1.011 (2.99)	−1.817 (2.57)
	−24.14 to 11.67	−24.14 to 11.67	−17.44 to 5.45
% in durable manufacturing	−1.384 (3.51)	−.759 (3.36)	−3.124 (3.34)
	−23.49 to 20.22	−23.49 to 20.22	−22.42 to 5.02
% in other manufacturing	.278 (.41)	.269 (.44)	.305 (.30)
	−4.13 to 3.09	−4.13 to 3.09	−1.09 to 1.47
% in transportation, communi-cations, and public utilities	−.016 (1.64)	.039 (1.77)	−.168 (1.17)
	−15.81 to 15.41	−15.81 to 15.41	−6.00 to 6.45
% in wholesale trade sector	−.135 (1.15)	−.235 (1.21)	.146 (.88)
	−5.71 to 8.99	−5.71 to 8.99	−3.33 to 8.99
% in retail trade industrial sector	1.088 (2.12)	1.045 (2.31)	1.208 (1.43)
	−9.68 to 13.68	−9.68 to 13.68	−4.93 to 6.39
% in finance, insurance, and real estate sector	.508 (1.00)	.428 (1.01)	.731 (.94)
	−6.23 to 5.91	−6.23 to 4.78	−4.51 to 5.91
% in services industry	3.645 (2.80)	3.531 (3.01)	3.962 (2.08)
	−12.27 to 20.03	−12.27 to 20.03	−5.63 to 11.41
% executive, administrative and managerial occupations	.788 (1.54)	.456 (1.51)	1.716 (1.23)
	−6.66 to 7.01	−6.66 to 6.84	−1.56 to 7.01
% technicians occupations	1.911 (1.70)	1.683 (1.81)	2.545 (1.14)
	−9.02 to10.18	−9.02 to 10.18	−2.50 to 7.83
% farming, forestry, fisheries occupations	−1.844 (2.96)	−2.297 (3.27)	−0.582 (1.14)
	−35.83 to 10.89	−35.83 to 10.89	−7.00 to 7.84
Mining-dependent (USDA, ERS 1989)	.048	.065	—
	0 to 1	0 to 1	
Farming-dependent (USDA, ERS 1989)	.181	.246	—
	0 to 1	0 to 1	
Retirement county (Longino 1995)	.083	.073	.112
	0 to 1	0 to 1	0 to 1
Native-owned casino in county	.032	.032	.032
	0 to 1	0 to 1	0 to 1
Household structure and demographic change [b]			
% of population of baby boom age	−1.184 (3.79)	−1.223 (3.59)	−1.076 (4.27)
	−32.23 to 12.92	−29.70 to 12.04	−32.23 to 12.92
% of 1990 population in-migrants between 1985 and 1990	20.065 (8.05)	18.847 (7.35)	23.459 (8.91)
	4.58 to 83.41	5.26 to 64.09	4.58 to 83.41
% in-migrants	−1.842 (4.69)	−2.157 (4.89)	−0.962 (3.98)
	−36.51 to 31.29	−36.51 to 31.29	−17.17 to 15.94

Table 1, continued

Variable Name and Description	Descriptive Statistics: Mean (Standard Deviation) Minimum and Maximum Values		
	Total	Nonmetro	Metro
% of households female-headed with children	.844 (1.10) −3.57 to 7.77	.972 (1.14) −3.57 to 7.77	.489 (.87) −2.92 to 3.64
% of households headed by person 65 and older	1.852 (2.36) −8.36 to 14.57	1.838 (2.45) −8.36 to 14.57	1.891 (2.10) −7.36 to 8.22
% of single-person households	2.584 (1.65) −7.26 to 16.81	2.710 (1.69) −7.26 to 16.81	2.232 (1.48) −3.33 to 6.90
% of population 25 or older with college education	2.032 (2.02) −8.78 to 16.49	1.536 (1.70) −8.78 to 16.49	3.413 (2.20) −1.88 to 13.47
% black in 1980	8.546 (14.39) 0 to 84.16	8.159 (15.19) 0 to 84.16	9.626 (11.83) 0 to 70.62
% black	−.022 (1.56) −11.89 to 16.92	−.058 (1.33) −11.89 to 9.37	.078 (2.06) −11.71 to 16.92
Labor supply and job quality [b]			
Labor force participation	2.966 (2.90) −11.53 to 19.61	2.753 (3.01) −11.53 to 19.61	3.558 (2.48) −5.02 to 12.43
% mothers working	14.463 (6.32) −8.83 to 53.85	14.910 (6.92) −8.83 to 53.85	13.216 (3.94) 1.82 to 29.62
% workers full-time hours, part time weeks in 1980	28.136 (5.17) 13.44 to 53.78	28.854 (5.46) 13.44 to 53.78	26.138 (3.57) 14.27 to 43.03
% workers full-time hours, part time weeks	−3.229 (3.15) −16.88 to 22.69	−3.019 (3.44) −16.88 to 22.69	−3.816 (2.01) −10.13 to 5.22
Population size and other controls [b]			
Average public assistance payment ($000)	.082 (.76) −6.58 to 7.65	.063 (.84) −6.58 to 7.65	.134 (.46) −1.25 to 2.26
Population in 1980 (natural log)	10.115 (1.32) 4.51 to 15.83	9.603 (.94) 4.51 to 11.99	11.542 (1.17) 8.44 to 15.83
Change in ln population, 1990 minus 1980	.029 (.14) −.39 to .97	−.005 (.12) −.39 to .81	.123 (.16) −.25 to .97
South region	.452 0 to 1	.446 0 to 1	.467 0 to 1
Median household income in 1980 ($000)	22.591 (5.22) 10.52 to 47.33	20.923 (4.12) 10.52 to 41.40	27.241 (5.14) 15.12 to 47.33

Note: N = 3,067 counties; 2,257 nonmetro and 810 metro.
[a] Values are 1990 minus 1980 percentages employed unless indicated otherwise.
[b] 1990 minus 1980 values unless indicated otherwise.

Results

Table 1 displays the descriptive statistics for the polarization indices and the independent variables used in the models. On average, income inequality increased from 1980 to 1990; the largest average increase occurred among metro counties. (Counties are not weighted, so each contributes equally to the index.) Nonmetro counties show greater variation than metro counties, however. To interpret the polarization index, a value of 4.5 indicates change equivalent to a net movement of 4.5 percent of households from the seventh or eighth decile to the top decile.

Average upper polarization is greater than median or lower polarization: metro counties show the largest average increase (4.35), more than double the average increase in nonmetro counties (2.12). The average increase in upper polarization was greater than for the median and lower polarization measures. The average lower polarization index is negative in both metro and nonmetro areas, with a larger average decrease in inequality in metro than in nonmetro areas. These averages do not fully support the notion of a gutting of the middle class; rather, they suggest increasing inequality overall, along with an upward shifting of households.

Patterns of Change in Income Inequality, 1980 to 1990

Table 2 identifies counties where income inequality increased or decreased overall (based on the median polarization index), and shows whether change occurs because of shifts in the upper or the lower half of the income distribution. In the nonmetro and metro comparisons, income inequality increased in 60.9 percent of nonmetro and 73.2 percent of metro counties from 1980 to 1990. Among counties with increasing inequality, the most likely pattern was a shifting of households toward both the top and the bottom of the income distribution (increasing upper and lower polarization, or a gutting of the middle class); this pattern was found in 50 percent of these metro counties and 47 percent of these nonmetro counties.

A shift to the top of the distribution, combined with households moving away from the bottom, was the second most common pattern. A larger share of nonmetro (16.2 percent) than metro counties (7.9 percent) with an overall increase in household income inequality registered a stronger shift of households toward the bottom, which was offset only partially by households moving away from the top and toward the middle. In the majority of counties that experienced increasing income inequality, polarization of incomes at the top of the income distribution played a major role.

Despite the emphasis on increasing inequality, 39.1 percent of nonmetro and 26.8 percent of metro counties actually showed declines in overall income inequality from 1980 to 1990. In a slightly larger share of nonmetro than metro counties (44.3 percent and 41.0 percent, respectively), households shifted from both the top and the bottom of the income distribution toward the middle. More metro (36 percent) than nonmetro (29.4 percent) counties saw a shift of households toward the top, which was outweighed by households shifting from the bottom toward the middle to yield an overall decline in income inequality. The lower panel of Table 2 shows the number of people who live in the counties identified in each group in the upper panel. We

Table 2. Counties and Population Experiencing Increases and Decreases in Income Inequality, 1980 to 1990

	Total	Nonmetropolitan	Metropolitan
Counties			
Increasing inequality overall	1,969 (64.2%)[a]	1,376 (60.9%)	593 (73.2%)
Increasing upper; increasing lower	946 (48.1)[b]	647 (47.0)	299 (50.4)
Increasing upper; decreasing lower	753 (38.2)	506 (36.8)	247 (41.7)
Decreasing upper; increasing lower	270 (13.7)	223 (16.2)	47 (7.9)
Decreasing inequality overall	1,099 (35.8%)	882 (39.1%)	217 (26.8%)
Decreasing upper; decreasing lower	480 (43.7)	391 (44.3)	89 (41.0)
Decreasing upper; increasing lower	282 (25.6)	232 (26.3)	50 (23.0)
Increasing upper; decreasing lower	337 (30.7)	259 (29.4)	78 (36.0)
Population			
Increasing inequality overall	195,065,510 (79.0)	35,651,239 (70.9%)	159,414,271 (81.0%)
Increasing upper; increasing lower	100,330,833 (51.4)	17,814,936 (50.0)	82,515,897 (51.8)
Increasing upper; decreasing lower	76,674,540 (39.3)	13,063,499 (36.6)	63,611,041 (39.9)
Decreasing upper; increasing lower	18,060,137 (9.3)	4,772,804 (13.4)	13,287,333 (8.3)
Decreasing inequality overall	51,944,511 (21.0)	14,609,380 (29.1)	37,335,131 (19.0%)
Decreasing upper; decreasing lower	23,678,354 (45.6)	5,982,251 (41.0)	17,696,103 (47.4)
Decreasing upper; increasing lower	11,805,883 (22.7)	3,833,233 (26.2)	7,972,650 (21.4)
Increasing upper; decreasing lower	16,460,274 (31.7)	4,793,896 (32.8)	11,666,378 (31.2)

[a] Percentage of total counties or population;
[b] Percentage of counties or population in inequality category.

see a concentration of population in counties with increases in income inequality from 1980 to 1990.

Multivariate Models of Change in Household Income Inequality

Ordinary least squares regression models of household income polarization are shown in Table 3.[2] As stated above, three different dependent variables are used: median, upper, and lower polarization. The models are estimated separately for nonmetro and metro counties and are not weighted; thus each county contributes equally to the analysis.[3] In these models, a positive coefficient indicates polarization of incomes or increasing inequality.

Overall change in income inequality: The median polarization models. The first set of models in Table 3 shows the estimated coefficients for the median polarization models. I had hypothesized that the consequences of economic restructuring would be greater in nonmetro than in metro counties, and this is borne out in Table 3. In fact, only three economic restructuring variables had significant coefficients in the metro model: differences in percentage employed in nondurable manufacturing, in durable manufacturing, and in technicians' occupations. In the nonmetro model, 17 different economic restructuring measures had significant coefficients in the final model. Among the predominant industry indicator variables, mining-dependent counties showed a substantial increase in income inequality, while income inequality declined from 1980 to 1990 in farming-dependent counties, retirement counties, and counties with

[2] Many of the independent variables in the models are calculated as differences across the two time points, 1980 and 1990. These types of measures often are used in fixed-effects models. In true fixed-effects models, the dependent variable also is measured as the difference between two time points. The assumption inherent in this type of model (if time 1 measures of the variables are not included) is that the effect of that variable's coefficient on the dependent variable is the same in 1980 and in 1990. This assumption is fairly strong. The other advantage of the fixed-effects estimation technique is that unmeasured forces (that have not changed from 1980 to 1990) are essentially assumed to be subtracted out of the model. The model estimated here is not a true fixed-effects model, nor is it intended as such. The dependent variable is a change measure; it is not the difference in inequality in 1980 and in 1990. Many of the independent variables are measured as first differences, but this is the case because the intent is to measure the effect of change in the characteristics on the change in the income distribution. Other independent variables are dummy variables reflecting 1980 conditions; still others (race, part-time employment, median household income, in-migration) are not change measures because the baseline value of these characteristics is expected to affect change in the income distribution.

[3] Models estimated with the natural log of population in 1980 as the weight did not differ substantially from the results reported here: no estimated coefficients compared across the weighted and the unweighted models were statistically different.

a casino owned by Native Americans. With the exception of the negative coefficients noted above, every significant coefficient for economic restructuring variables in the nonmetro model was positive; this suggests that an increase in employment in that sector was associated with an increase in income inequality. In keeping with the hypothesis that the effects of economic restructuring differ for metro and for nonmetro counties, 10 of the 15 variables were statistically different.[4]

Among measures of household structure and demographic change, an increase in the baby boom generation and a higher percentage of in-migrants were associated with a decline in inequality in both nonmetro and metro counties, while an increase in female-headed households, single-person households, and persons with a college education corresponded to increases in income inequality. As expected, these effects did not differ statistically across models. The only significant difference was for the percent difference in in-migrants: an increase in in-migrants was associated with a decrease in inequality in metro counties but not in nonmetro counties.

Increases in labor force participation had stronger effects in reducing overall inequality in metro than in nonmetro counties. Mothers working corresponded to less income polarization in nonmetro counties but was not significant in metro counties. The quality of jobs, measured by part-time weeks and full-time hours, did not differ in metro and nonmetro areas in influencing changes in income inequality. Higher levels of full-time hours and part-time weeks in 1980 and an increase in this type of employment as a percentage of the total were associated with income polarization.

In both settings, a higher median household income in 1980 was associated with income polarization between 1980 and 1990. The effects of population size and of location in the South, however, differed significantly for metro and nonmetro counties. A larger population in 1980 was associated with increasing inequality in nonmetro but not in metro counties. In nonmetro counties in the South, increases in income inequality were greater than in other nonmetro counties; this effect was not found among metro counties. An increase in public assistance payments corresponded to a decline in income inequality in nonmetro counties.

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[4] Because of concerns expressed about testing coefficients across dissimilar models (the nonmetro models contain dominant industry measures that are not available for metro counties), I reestimated the nonmetro models excluding the dominant industry measures, and conducted the tests for statistically significant differences in estimated coefficients on identically specified models. The test results for those models are designated with a superscript *a* in Table 3. Model results are available on request.

Table 3. Ordinary Least Squares Regression Models of Change in Income Inequality, 1980 to 1990

	Median Polarization		Upper Polarization		Lower Polarization	
	Nonmetro	Metro	Nonmetro	Metro	Nonmetro	Metro
Intercept	-9.995***	-6.482**	-15.410***	-17.813***	-5.101**	-2.514
Economic restructuring						
Agriculture (diff)	.175*	.247	—	—	.224***	-.012
Mining (diff)	.184***	-.114[a]	—	—	.203***	-.092
Construction (diff)	.277***	-.112[a]	.220**	.300*	.223***	-.252[a]
Nondurable manufacturing (diff)	.238***	-.190*[a]	.241***	-.009[a]	.121	-.151[a]
Durable manufacturing (diff)	.158**	-.164*[a]	—	—	.202***	-.012
Other manufacturing (diff)	.692***	.381	.757*	.221	.621*	1.272*
Transportation, communications, and public utilities (diff)	.292***	-.103[a]	.210*	.127	.253**	.003
Wholesale trade (diff)	.383***	.002[a]	.487***	.320	—	—
Retail trade (diff)	.247***	.022[a]	.170*	.548****[a]	.166*	-.200[a]
Finance, insurance, real estate (diff)	.251**	-.203[a]	—	—	.257*	-.202[a]
Services (diff)	.263***	-.001[a]	.178***	.421***	.229***	-.178[a]
Executive, administrative, and managerial occupations (diff)	.262***	-.049[a]	.419***	-.269[a]	—	—
Technician occupations (diff)	.021	.223*	.163	.421*	—	—
Farming, forestry, fisheries (diff)	.192**	-.112	.431***	.405*	—	—
Mining-dependent	1.347***	NA	2.792***	NA	—	NA
Farming-dependent	-.758***	NA	—	NA	-.714*	NA
Retirement county	-.772*	.057[a]	-1.006	-.164	—	—
Native-owned casino in county	-.907*	NA	—	NA	—	NA

Table 3, continued

	Median Polarization		Upper Polarization		Lower Polarization	
	Nonmetro	Metro	Nonmetro	Metro	Nonmetro	Metro
Household structure and demographic change						
Baby boom age (diff)	-.142***	-.149***	-.168***	-.124*	-.115**	-.073
In-migrants 1985 to 1990	-.074***	-.090***	-.135***	-.054	—	—
In-migrants (diff)	.010	-.108***a	.137***	-.148*a	-.101***	-.030
Female headed households (diff)	.764***	.634***	1.116***	.800**	.521***	.731***
Older person households (diff)	.096*	-.049	.328***	-.401***a	-.177**	.272*a
Single person households (diff)	.390***	.539***	.366***	.595***	.424***	.493***
College education (diff)	.202***	.158*	.265**	.109	.128	.192*
% black in 1980	—	—	—	—	.032***	-.012a
% black (diff.)	.139*	.065	-.044***	-.019	—	—
Labor supply and job quality						
Labor force participation (diff)	-.185***	-.360***a	-.122*	-.733***a	-.253***	-.054
Mothers working (diff)	-.096***	-.056	-.110***	.129*a	-.109***	-.220***a
Workers full-time hours, part-time weeks in 1980	.182***	.176***	.285***	.326***	.060*	.027
Workers full-time hours, part-time weeks (diff)	.123***	.098	.189***	.208*	—	—
Population size and other controls						
Average public assistance (diff)	-.211*	-.130	—	—	-.342*	-.982**
Population in 1980 (natural log)	.299*	-.097a	—	—	.730***	.309*a
Log population (diff)	-.582	-1.872	-1.514	-3.757	-.251	-4.944***a
South region	.864***	-.156a	1.535***	-.046a	—	—
Median household income in 1980	.182***	.232***	.522***	.471***	-.180***	-.013a
Adjusted R^2	.395	.610	.290	.430	.184	.260
N	2,257	810	2,257	810	2,257	810

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.
[a] Nonmetro coefficient is statistically different from that for the identically specified metro model at $p \leq .05$ (two-tailed test).

Polarization at the top of the income distribution: Upper polarization models.
The second set of models in Table 3 shows the factors associated with
polarization of household income above the median. We see a stronger
association between economic restructuring and shifts in households
in the top half of the income distribution in nonmetro than in metro
counties. Ten economic restructuring coefficients were statistically sig-
nificant in the nonmetro models, compared with only five in the metro
models. Among these, three were statistically different in the two mod-
els: nondurable manufacturing and executive and managerial occupa-
tions exerted larger effects on upper polarization in nonmetro than in
metro counties, while retail trade had a larger positive effect in metro
counties. Only increases in employment share in construction, retail
trade, services, and technicians' occupations were associated with up-
per polarization among metro counties.

In the nonmetro upper polarization model, differences in agricul-
ture, mining, durable manufacturing, finance, insurance, and real es-
tate, and technicians' occupations were not associated with changes in
inequality. An increase in the share of employment in the other sec-
tors, however, corresponded to a shift of households toward the top of
the income distribution. The coefficient for mining-dependent coun-
ties was large and positive; this finding suggests that households shifted
toward the top of the income distribution in such counties, in keeping
with increased capitalization and higher wages but reduced employ-
ment in the mining industry.

Among the measures of household structure and demographic
change, only two variables had statistically different coefficients in the
metro and nonmetro models. The difference in percentage of in-
migrants was associated positively with upper polarization in nonmetro
counties, but negatively in the metro models. An increase in the share
of older-person households corresponded to an increase in upper po-
larization in nonmetro counties and to a decline in metro counties.
These opposite effects suggest that quite different processes related to
migration and the aging of the population are occurring in metro and
in nonmetro areas. An increase in persons with a college education cor-
responded to upper polarization in nonmetro counties but not in metro
counties, while a higher percentage of blacks in 1980 corresponded to a
decline in inequality above the median in nonmetro counties.

An increase in labor force participation was associated with house-
holds shifting toward the middle of the income distribution in metro
and nonmetro counties, but the effect was stronger in metro counties.
An increase in working mothers decreased inequality at the upper end
of the income distribution in nonmetro counties but was associated

with upper polarization in metro counties; this difference was statistically significant. Part-time employment had similar effects in metro and nonmetro counties, increasing inequality above the median.

Neither difference in public assistance payments nor the population in 1980 was associated with upper polarization in either the metro or the nonmetro models. A larger median household income in 1980 was associated with greater upper polarization in both metro and nonmetro counties. Nonmetro counties in the South experienced greater upper polarization than those outside the South, a relationship not found in metro counties.

Change in income inequality at the bottom of the income distribution: Lower polarization models. As in the other models, economic restructuring measures play a larger role in explaining changes in income inequality at the bottom of the income distribution in nonmetro than in metro counties. Only the "other manufacturing" share of employment is associated with lower polarization in metro counties. In nonmetro counties, an increase in employment percentage in nine different industrial sectors corresponded to increased inequality below the median. Among these nine, four had coefficients statistically different from those in the metro models. In nonmetro counties, increases in employment share in construction, retail trade, finance, and services were associated with shifts of households toward the bottom of the income distribution. Nonmetro farming-dependent counties were associated with an upward shift.

The coefficients for the household structure and demographic change measures were statistically similar in the metro and the nonmetro models, with two exceptions. First, an increase in the share of households headed by older persons corresponded to a decline in inequality at the bottom of the income distribution in nonmetro counties, but in metro counties this demographic change was associated with shifts of households toward the bottom of the income distribution. Second, percent black in 1980 was associated with an increase in lower polarization, or an increase in the share of households at the bottom in nonmetro counties, but not metro counties. A larger share of female-headed and single-person households corresponded to increases in households at the bottom of the income distribution in both metro and nonmetro counties. Finally, in nonmetro counties, increases in the share of baby boom-age residents and in-migrants were associated with decreasing inequality at the bottom.

Only an increase in mothers working was associated significantly with lower polarization in metro areas. This increase reduced inequality, a statistically larger effect than in the nonmetro model. Increases in nonmetro labor force participation shifted households toward the

middle of the income distribution from the bottom, but a larger share of workers employed full-time hours, part-time weeks in 1980 was associated with lower polarization. Among the control variables, an increase in average public assistance payments was associated with a shift of households away from the bottom in both metro and nonmetro counties. A larger population size in 1980 corresponded to a shifting of households toward the bottom in both metro and nonmetro counties, but the effect was stronger in nonmetro counties. In metro counties, an increase in population size was associated with a decline in inequality below the median; in nonmetro counties, higher median household income in 1980 corresponded to a shift of households away from the bottom and toward the middle of the income distribution.

Changes in household income inequality from 1980 to 1990 in nonmetro counties were associated with economic restructuring more strongly than were changes in inequality in metro counties, and many of these effects differed in the metro and the nonmetro models. There was more consistency in coefficients among the other variable groups, as expected. Some exceptions occurred, however. In particular, the statistically significant coefficients for changes in in-migration, households headed by older persons, and mother's working differed significantly in the direction of their effects on income polarization in the metro and the nonmetro models. This finding suggests that these changes affect the changing income distributions in metro and nonmetro counties by quite different processes.

Discussion and Conclusions

Household income inequality certainly increased on average across the United States and in metro and nonmetro counties from 1980 to 1990. Not all counties in the United States experienced that increase, however. Income inequality declined in 39 percent of nonmetro counties, compared with 26.8 percent of metro counties. Inequality did not increase predominantly through the shifting of households away from the middle of the income distribution and toward both ends, as has been suggested: in almost half of the counties, it increased as a result of other patterns in households' shifts in the income distribution. Because of the great variation in the change in income inequality across counties, the factors underlying these changes must be identified.

In keeping with the theoretical discussion and the literature review, I found that economic restructuring was much more important for changing income inequality among nonmetro than metro counties. This relationship held whether I examined overall inequality or the upper or lower polarization of household incomes. The consequences of

economic restructuring are felt more strongly in nonmetro counties, where labor markets tend to be smaller and less diverse, and where changes would tend to ripple through the local economy with more substantial consequences for other industrial sectors. This finding indicates the importance of identifying the nature of industrial restructuring, both in regard to changes in technology and relations of production, and in regard to the spatial redistribution of industrial sectors and production processes (Bluestone and Harrison 2000; Marshall 2000; Osterman 1999) and the forces governing such change.

The finding that economic restructuring plays a relatively small role in changing income inequality in metro counties may explain why some prior studies found a small role for such restructuring in *increasing* income inequality. Many of these studies used metro areas as the unit of analysis or employed national samples of individuals; both approaches would result in a minimal role for industrial restructuring in explaining income inequality. The consequences of economic restructuring in nonmetro areas present a much different picture of the importance of such processes and how they affect local communities. Case studies of particular industries, and of the consequences of changes in industry structure and production technology in communities, would increase our knowledge of the processes by which such changes affect both the industry and the local community. In addition, multilevel models that incorporate individual-level information on changes in employment, job quality, and income with family or household, industry, and community characteristics would further clarify the processes by which economic restructuring affects individuals' lives.

Nonmetro counties' differing capacities to adapt to restructuring will affect implications for the distribution of household income. In particular, residents and leaders in local communities and counties must gain the skills and knowledge to recognize the consequences of job losses caused by relocation or plant closure, and must be able to work with residents and remaining employers to identify economic development strategies that will not exacerbate inequality among residents. Communities must be prepared to help residents gain the skills and training to compete successfully for the new jobs that result from changes in production technology. Also important is a careful examination of the implications, for income inequality, of gains in employment through economic development efforts. It is critical, however, that efforts to increase income equality focus on raising the incomes of those at the bottom of the income distribution.

Changes in job quality often associated with restructuring suggest that an increase in part-year employment increases overall inequality

and is associated with households' movement to the top of the income distribution in both metro and nonmetro areas. The part-time quality of employment is an important consideration; equally important, however, this type of employment did not increase, on average, in nonmetro counties from 1980 to 1990.

Household income inequality in both nonmetro and metro counties is affected by changes in household structures: increases in female-headed and single-person households were associated with increasing inequality. An increase in share of households headed by elders shifted the income distribution upward in nonmetro counties but downward in metro counties. In fact, a change in older households is unrelated to overall change in income inequality in metro counties and exerts only a relatively small effect in nonmetro counties. To help explain these findings, researchers should examine further the differential effects of elderly households on changing income inequality in nonmetro retirement destinations and aging-in-place counties.

Why should those who are interested in nonmetropolitan areas and the well-being of nonmetro people and places be concerned about increasing income inequality? First, increasing income inequality was not the consequence of changes only during the 1970s and 1980s. More recent data from the Current Population Survey indicate that income inequality continued to increase during the 1990s, despite economic expansion (Jones and Weinberg 2000). In some cases, this increase in inequality occurred in nonmetro areas at the same time as real declines in median household incomes (McLaughlin forthcoming).

Second, increasing inequality has consequences. Ken Wilkinson (1991) made a strong case that income inequality was one deterrent to the ability of a community's residents to find common ground that would enable them to work together to improve their own well-being. Recent case studies by Billings and Blee (2000) and Duncan (1999) provide evidence of the negative consequences for residents' well-being, which can be traced to high levels of inequality in rural communities. Greater income inequality also has been tied theoretically to underinvestment in local social, educational, and health services infrastructures (R. Wilkinson 1996), which further erode individuals' well-being. Thus the increase in income inequality should be a matter of concern to policy makers, local leaders, and residents alike.

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